India's IT talent base improving engineering design, simulation  "Taking advantage of India's IT talent, trend is seen in the areas of engineering design and simulation," says Reena Bhagwati, President, IIF  More on page 11...  

Metal casting is one of the most energy intensive sectors in India. The Bureau of Energy Efficiency (BEE) in India has listed metal casting industry to be among the top ten major industrial sectors in India in terms of greenhouse reduction potential. Here are some common ways of improving the energy performance of Indian foundry units.

**Energy efficiency in cupola melting**

Cupola is, by far, the most common type of melting furnace among small scale foundry units in India. The energy conservation measures identified in cupola furnaces can be categorized under the following categories.

**Adoption of properly designed Divided Blast Cupola (DBC)**

Proper design of the cupola is the most important factor contributing to improving its energy efficiency. The most common design error occurring in a unit is incorrect selection of the blowers. The other aspects such as tuyere position, size of well, and stack height are also important. DBC is a proven technology for improving the energy efficiency at a modest investment. The benefits of properly designed DBC include higher metal tapping temperature (about 40-50°C), reduction in charge coke consumption (at least 15 percent) and increase in melting rate (by more than 20 percent).

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In Person

‘Foundry industry market shifting to Asia’

Please tell us on the status of foundry industry globally?

As per the 47th Census of World Casting Production in 2012, a year after World Casting Production exceeded pre-2008 levels, the annual global casting production has crossed 100 million mt mark, a 2.3 per cent increase from 2011. China remained the world’s largest producer with a total volume of 42.5 Mn MT, a total of 43 per cent of global production.

These are clear indications that the foundry industry is shifting to Asia. In 2006 India changed its rank from 7th to 4th and then in 2011 to 2nd and once again to 3rd place in 2012. The recent census figures show that the top five cast producing countries include China, USA, India, Japan and Germany. Present production capacity of Indian foundry industry is 9.34 Mn MT per annum for 2012 (marginally down as compared to the year 2011) whereas China was at 42.50 Mn MT, USA at 12.82 Mn MT, Japan at 5.34 Mn MT and Germany at 5.21 Mn MT.

Your view on Indian foundries adopting global standards.

Most of the leading foundries have adopted global standards. They have set the standards and specifications. Around three years ago, a few foundries decided to double the capacity, which have come into production. However, no new large investment has been done. But small and medium foundries are investing in moulds to improve their productivity and quality, which could be in moulding, core making, forging etc.

On technological transformation in the industry.

Indian foundries and manpower are open to technology transformation in the foundry industry for meeting global challenge. Many changes have taken place in the past 5-7 years. Today, the manpower involved in the foundry industry is 5,00,000 (directly) & 15,00,000 (indirectly). Moreover, the foundry industry is expected to generate demand for additional 1.5 mn to 2 mn jobs directly and indirectly.

At present, there are few organized training institutions with focus on foundry technology. As such, most workers at shop floor lack any formal training and learn on the job.

On the collective role of institutes and industry in skill development.

Today NIFT-Ranchi and few centres under the Institute of Indian Foundrymen (IIF) are offering foundry training courses. Also, an advanced diploma course in foundry training institutions with focus on foundry technology has been introduced.

Vinod Kapur, Chairman & Managing Director of Gargi Huttenes Albertus Pvt Ltd, who was recently appointed President of the World Foundry Organization, shares with Paresh Parmar his vision for the industry globally and provides useful suggestions that could help domestic foundries achieve numero uno position on global map.

WFO Welcomes New President

Vinod Kapur has been elected as World Foundry Organization (WFO) President for 2014 and 2015. He has served on the WFO Executive board for past five years and is a former President of The Institute of Indian Foundrymen. He is the Chairman & Managing Director of Gargi Huttenes Albertus Pvt Ltd, a well-respected businessman and foundry material supplier based in Mumbai.

Vinod has long been a familiar face in the industry throughout the world, having joined the then Institute of British Foundrymen in 1973 and has travelled around the globe to develop his extensive knowledge of the cast metals industry.

WFO General Secretary, Andrew Turner said: “We are delighted that the membership voted unanimously for Vinod to take over the two-year role as WFO President. He is a worthy choice having developed a very successful company in India which represents several global foundry supply companies from Europe. Vinod’s passion for the industry and for the people employed in it will be an asset to the WFO.”

Vinod takes over the honorary Presidential role from Xabier Gonzalez Azpiri of Spain who has held the position for the past two years.

Speaking on his appointment Vinod said, “I am very thankful to the WFO General Council for their confidence in me and having elected me as President of the WFO for the years 2014 and 2015. I feel proud to be in this esteemed position to represent my country and of course The Institute of Indian Foundrymen.”

On the collective role of institutes and industry in skill development.

Today NIFT-Ranchi and few centres under the Institute of Indian Foundrymen (IIF) are offering foundry training courses. Also, an advanced diploma course in...
Reena Bhagwati, Joint Managing Director, Bhagwati Autocast Ltd who was recently appointed as President of the apex industry body The Institute of Indian Foundrymen (IIF) in an interview with Paresh Parmar chalks out the roadmap to boost innovation and upgradation in domestic foundries elevating to international standards...

What will be your immediate priority areas for the industry in your role as IIF President?

My family has been in the foundry industry for over three and a half decades. You can say that this industry is my second home. As a practicing foundrywoman (laughs, our ears are so attuned to hear foundryman), I feel there are certain perceptions as well as certain real challenges that confront our industry.

Some of the issues that trouble the industry include:

Perception issues: Regarded as a dirty business and lack of commensurate returns is making it disinteresting for the young generation of successors to take over the reins,

People issues: Unable to attract fresh talent; safety standards below acceptable level; pollution control mechanisms not keeping pace,

Technology issues: Majority of foundries are still pursuing dated production processes; lack of energy efficient machines,

Funding issues: Banks/FIs are not interested as majority of foundries (small-scale) are proprietary concerns and status of accounts,

Cost issues: The cost of manufacturing is on the rise due to inadequate infrastructure; raw materials like scrap metals and coke; energy costs and increase in wages, and

Quality issues: A major area of concern.

Keeping these issues in mind, I would like to focus on energy efficiency in foundries; adhering to environment standards; skilling up of human resource for the foundry industry; work with equipment manufacturers/academia to come up with affordable technology; customer centricity; and setting up of the foundry development council.

How is India’s foundry market compared to its global counterparts?

According to the 46th census of World Casting Production as published by Modern Casting, India is in the 3rd position in the world in terms of tons of castings produced. India has produced 9,994 million tons in the year 2011. The top two casting producers were China with 41.26 million tons and USA with 10.008 million tons. On new technological trends observed in foundries.

Technology advancement plays an important role in lowering production costs, improving energy efficiency, enhancing environmental quality and creating innovative cast products. India has approximately 4,600 foundry units, 80 per cent of which are in the SME sector.

The new technological trend observed is the use of semi-automatic technologies in foundries. Some of the foundries are experimenting in the field of robotics and 3D printing. Taking advantage of India’s Information Technology talent base, increasing trend is seen in the areas of engineering design and simulation.

How do you see energy savings and sustainable production in foundries?

Metal casting is one of the most energy-intensive industries in India. Most of this energy use can be attributed to melting. This has forced the industry to find ways to become more energy efficient in order to remain competitive. The industry has made good progress in reducing its energy cost by developing and adopting more efficient equipment and making changes in some of its processes. There are challenges but the industry is trying to find out different solutions by focusing on innovation.

The Institute of Indian Foundrymen (IIF) is conducting a number of programmes and events to discuss and promote such initiatives. How do you see the exports market for foundries at present?

The present (FY 2012-13) turnover of the industry as per the Institute of Indian Foundrymen (IIF) is 391243. This shows that the industry is growing.
Molds and Cores digital production by using 3D printing for sand casting

Three-dimensional printing technology continues to create novel applications as a means to decrease costs and lead time compared to conventional manufacturing techniques.

Metal castings are ubiquitous in consumer and military products and are increasingly being evaluated for cost-effective applications in new product development programs. All castings are currently produced using a ‘pattern’ technique, which is a critical and integral step of the casting process.

The ‘pattern,’ typically the item with the longest lead time, represents considerable expense, is produced from a diminishing pool of skilled trade resources and imposes a lack of agility to new product development programmes. Three-dimensional printing technology continues to develop new materials, processes and equipment for emerging markets, and create novel applications as a means to decrease costs and lead time compared to conventional manufacturing techniques.

ExOne technology

The ExOne Company (ExOne) has developed a line of 3D sand printing equipment to manufacture sand molds and cores without the requirement to manufacture a pattern or series of patterns. Since the process does not require a pattern to produce the casting, low volume service parts that do not have available tooling, low volume product development applications and low volume niche production are ideal candidates when response time, set-up charges for small batch production and tooling costs must be minimized.

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of the new equipment into existing manufacturing and foundry procedures. The large building volume and high building rate combine to make patternless production for metal-based prototypes and small-scale production. The molds and cores are built in a layer-wise fashion.

Each layer comprises foundry materials added sequentially:

Foundry sand, which is mixed with an activator just before spreading. A re-coating mechanism applies the sand mixture onto the entire job box, layer by layer.

Binder, which is selectively ‘jetted’ onto the sand mixture. This is analogous to an inkjet printer, where the printhead dispenses the binder onto the activated sand mixture, based upon computer instructions per each layer. The binder and activator chemically react and harden to form the 3D sand mold or core.

Figure 1 shows the S-Max & S-Print System, with integrated material conveyance, unloading station. Also shown is a job being printed in the print station (Figure 2).

Basic change to the process of acquiring castings

The graphical representation (Figure 3) provides a comparison to help demonstrate the inherent flexibility of the process.

Left hand side process represents the conventional sand casting process where a pattern is created to produce sand molds.

Right hand side represents the 3DP process. No pattern needs to be created to produce the molds since the molds are not pulled from a pattern, but are produced (3D printed) directly from the CAD file.

Therefore, eliminating a number of process steps.

The unbound sand is removed using an industrial vacuum system followed by brushing the loose sand from the finished cores. Also, component size is not limited to the build box size. Since the printed objects are created in a CAD environment, multiple pieces can easily be interlocked allowing for large molds to be pieced together. All thread bolting and lifting provisions can be created in the printed pieces.

Figures 4-7 show various sand molds and cores printed in the job box during one production build. This demonstrates the flexibility of the process to produce multiple, patternless sand molds and cores directly from CAD files.

Applications and examples

Many successful castings have been made from the process. A few examples are shown in Figure 8.

Overview of the information flow

A 3D solid CAD file of the part is required. From this part file, a 3D solid CAD file of the mold package is designed and then converted to .STL files. The .STL files are checked for integrity (edges and surfaces) and are then used as the input information to the software.

The .STL files, which represent the parts in the mold package, can be rotated, panned and translated easily with the Rapix3D software. Rapix3D then transforms the 3D CAD file (.STL) to a .CLI file, thereby converting the 3D parts of the mold package into a sequence of slices. The CLI file is loaded into the S-Max process station over a standard network connection. The intuitive menu display allows for easy job setup, management and monitoring. Optionally, a copy of each job can be kept locally on the machine, allowing jobs to be repeated.

System configurations and attributes

The ExOne equipment is designed and built to produce sand molds and cores. The system equipment is not modified from rapid prototyping equipment – it is designed and built for use in production on the production floor. The following describe some of the key characteristics of the system design:

System is modular – a standard mechanical interface with standard electrical inter-connects with standard length conveyors.

System is reconfigurable – equipment layout can easily be changed to allow for stand alone, workstation, cell, or an
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Benefits

The following summarizes the benefits of the EuOne 3DP process:

- Eliminates the need for use of patterns to create sand molds and core.
- This will reduce/eliminate the high cost of labour and human errors associated with pattern making.
- And with skilled pattern makers in short supply, the process will provide productivity improvement while decreasing the need for additional skilled labour.
- Customers can experience dramatically reduced lead-times (design through casting) by as much as 50 per cent, prototype production can be doubled thus saving floor space that additional conventional equipment would require.
- For high-volume casting requirements, molds for matchplates may be generated. Since the tooling data is in digital form, the aluminum matchplates may be discarded after the production run thus eliminating the need for pattern storage. Also, if a design change occurs between production runs, the digital file is easily manipulated to produce the latest revisions.
- Core and drag fabrication times can be reduced further by reducing the mass of the casting components (such as cores) by adopting hollow designs.
- Future component ECO’s can be incorporated further by reducing the mass of the casting components (such as cores) by adopting hollow designs.

Figure 7

Cope and drag fabrication times can be reduced further by reducing the mass of the casting components (such as cores) by adopting hollow designs.

Future component ECO’s can be incorporated further by reducing the mass of the casting components (such as cores) by adopting hollow designs.

This will reduce the time to produce revised molds and cores for sand castings by typically 50 per cent.

- This will reduce the price and lead time to the end customer while reducing the cost of mold/core production, potentially increasing margins.
- The ability to produce better parts faster when casting dynamics are understood earlier in the design cycle, allowing for changes prior to committing to production tooling.
- Direct digital production of molds and cores:
  - Production of the sand molds and cores is driven directly from the CAD data.
  - Multiple design iterations can be achieved in a matter of days to determine the optimal mold/core design.
  - Understanding of shrinkage, porosity and solidification parameters prior to purchasing expensive, long-lead production tooling.
  - Elaborate, thin wall, delicate or lacy cores can be produced, heretofore not achievable.
  - Small design changes in the CAD file for the part and mold can create a family of parts.
  - Mass customization, eg unique serialization or traceability codes can easily be added in the software.
  - Compete on a new level:
    - Allows for an ‘unlevel’ playing field – changes the competitive equation from direct labour to lean manufacturing.
    - Allows for distributed manufacturing and flexible manufacturing.
    - Enables e-manufacturing.
    - Changes the basis to achieve financial success from time and material to value.
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Suggested topics:
- High quality and high weight casting for OEs
- Power: Industry: reducing: carbon emissions
- Automation: improving efficiency and workforce: safety
- Cost: effective: equipment for serial: reconditioning
- Innovation: in tool: investment: technology
- Macro: technology: applications: in foundries
- Refractory: material: technology: applications
- Financial: credits: for: energy: efficient: equipment

Panel discussion:
- Analyzing: casting: market: trend: – China, USA, Europe, Indonesia, India, Japan, and others

Authors are invited to submit abstracts on topics spanning basics to innovative technologies, products that have contributed to optimisation in foundries and greener technology concepts synonymous with sustainability.

Important dates:
- Call for Papers Open: 1st October 2013
- Call for Papers Closes: 30th May 2014
- Notification of acceptance: 10th June 2014
- Abstracts due: 30th June 2014
- Final Presentation due: 31st July 2014

Submissions must be original which will be evaluated by the organising team.

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The Mumbai-based Minex Metallurgical believes in constant innovation to develop top-notch alloying solutions. “We are in the process of re-engineering our processes to meet exacting demand of the industry and business environment we operate,” says the company’s Chairman & Managing Director, S B Misra in an interview with Paresh Parmar.

How do you expect 2014 for business? What are your strategies across specific sectors – ferrous, nonferrous, and foundry?

Minex products are linked to growth of the steel, foundry and aluminium sector and as these sectors are in recovery and slow growth mode, we do expect stable-to-slow growth in 2014. Our strategy for all sectors is to develop products and processes for value addition at customer place by understanding customer’s need. We are also in the process of re-engineering our processes to meet exacting demand of the industry and business environment we operate.

Tell us about your expertise in speciality alloys. How has been the acceptance in the domestic market?

Since our inception in the early 80s, we have been engaged in the development of Melt Treatment alloys for steel, GI and SG foundry, aluminium industry and other special metallurgical products. Our expertise is in the areas of product and process development, application metallurgy and marketing. The journey started with a modest beginning with the introduction of a simple de-oxidation alloy: ferro aluminium as a pioneering product for secondary steel industry in the domestic market which was well accepted.

With this initial support, Minex developed the wire injection metallurgy for secondary steel sector, an important and cost-effective tool for making clean and value-added steel. Minex offers an entire spectrum of technology which includes a wide range of wire injection systems, cored wires and solid wires designed for specific application.

Minex also offers a range of specialty alloys like eutectic ferrotitanium for special steel and stainless steel, other complex alloys, spherodizing alloys and innoculants for GI and S.G iron Industry, a range of aluminium master alloys for primary and secondary aluminium sector, metal powder for welding and other specialty products.

Most of Minex products have been introduced as an import substitution or a value-added product for each industry. Minex being a pioneer, quality and customer-focussed organization, the response from the domestic market has been very supportive and one of major reasons for our existence and growth in the past three decades.

Minex introduced cored wire injection metallurgy to the domestic market in mid-80s simultaneously when the technology was being introduced in the international market. In the first phase we started developing cored wire injection equipment and supplied to the domestic steel sector which was introducing secondary steel making process.

Along with our own development we collaborated with Trefil Arbed Welding, Belgium, for design engineering and technical knowhow. In the 90s we independently developed several models of this equipment meeting various requirements of different customer’s needs.

Minex also provides technology of wire injection metallurgy for steel and foundry and export its products to various countries including Europe and South Korea. We are also supplying turnkey projects for magnesium wire injection for 5G iron industry in the overseas market.

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How is the exports scenario for your products?
Minex has steadily increased its export from 15 per cent of total sales to close to 25 per cent in the past few years. We feel the export potential of our products is good as we support customers to differentiate products from commodities and look for long term value-added partnership relation.

What are the current technological innovations, R&D efforts by Minex to produce quality products?
Our focuses are in various areas of new products, application metallurgy, raw material, cost & productivity, energy and environment. In recent years Minex is focusing on integrated management system (IMS) with specific reference to ISO 9001, 150 14001 and OHSAS 18001 for quality, environment, safety and health respectively.

Minex also needs the focus to focus on triple bottom line, ie Economic, Environmental and Social and has established a guideline to achieve the same.

How have you started taking the value of intellectual property for your indigenous products and innovative breakthroughs?
Being an indigenous, grass root and pioneer alloying solution developer, we have established many unique processes. We have started focussing recently and have initiated the patenting process. Please comment on the BT award you have initiated the patenting process.

What are the current technological innovations, R&D efforts by Minex to produce quality products?
Our corporate vision is 'To be a Respectable Company in the Fields We Operate.' We see tremendous potential in the areas of alloying solution. Being a young industrial nation we can grow very rapidly in these areas.

Ahead of IFE 2014, what will be your expectations from the event?
IFEX is the most prominent event in the country for the foundry industry for exchanging views and get to feel the pulse of the industry. With over 1,200 foundrymen (expected) participating, in a not-so-favourable economic environment, speaks volumes about the attraction and organizing capability of the host chapter.

We are preparing well and expect over 20-member Minex team to be present to interact with visitors. IFEX is the platform to display our wide and extensive range of technology, products through intensive interaction. Please visit us at Hall 4, Stand H 06.

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BROKERS EXCUSE
India’s engineering sector expanded rapidly from the second quarter of 2013-14, showing impressive results as compared to the previous quarter of 2012-13, though, engineering exports made in November 2013 has shrunk abruptly from 8 per cent in October 2013 to (-)14.6 per cent in November 2013.

India’s cumulative growth rate of engineering exports registered a positive growth rate of 5.6 per cent from April to November 2013-14 in contrast to a growth rate of (-) 16.8 per cent over the same period last year. This was largely driven by engineering exports to India’s Free Trade Agreement (FTA) partners such as Japan, South Korea, Sri Lanka and the ASEAN bloc.

Exports to traditional Western markets such as the US and Germany, that account for a big chunk of total engineering exports, however, did not contribute much to India’s export revenue. Shipments to Japan grew 17 per cent in the April-November period of the current fiscal to $568 million compared with the same period last year. Exports to South Korea increased by over 13 per cent to $739 million during the period.

**Excerpts:**

How do you analyse EEPC’s role to promote exports from India?

Engineering Export Promotion Council (EEPC India), is the nodal body under the Ministry of Commerce & Industry which promotes exports of engineering goods. Since its inception in 1955, engineering exports have increased about 6,000 times and I am sure the council can take some credit for this growth. There are, of course, no grounds for complacency and EEPC India is aware of the challenges.

On your strategic vision and India’s growth path to enhance engineering exports in coming years, India’s share in global engineering exports hovers around 1 per cent. The main aim is to double the share in say, about 10 years. This requires considerable hard work in terms of upgrading the technology of Indian companies, especially, MSMEs, building India brand abroad, penetrating hitherto untapped market and simultaneously trying to maintain, if not increase, share in existing markets, are some of the various aspect of this strategic thinking.

On key demand drivers to achieve higher growth target set by EEPC, Revival in the EU and USA market across the board is the key demand driver. This will have a spin-off effect elsewhere. Secondly, it is the continuation of the policy of ‘harmonisation’ in China that stresses on balanced growth so that it imports more.

On EEPC’s strategy to accelerate ‘harmonisation’ in China that stresses on balanced growth, so that it imports more.

On EEPC’s strategy to accelerate bilateral/regional trade negotiations?

EEPC India is currently studying the impact of such agreements on India’s engineering sector. Once this study is carried a full response to this issue will be formulated. At the moment, we have informed the government about certain negative impacts like the problem of inverted duty resulting out of the trade agreements that is affecting the domestic industry, etc.

Well, there are key exports items and will continue to be so. They are the essential ingredients for engineering products. Without them, the products will cease to be called engineering goods. Hence they have a great presence.

Indian castings, pumps & valves are in great demand globally from the rest of the world. Your outlook for 2014 and its overall contribution to exports?

These are important constituents of the engineering sector though in the aggregate they amount to about $1.5 billion at present. There is considerable scope for them to increase further.

**Your suggestions to attract higher levels of FDI in the engineering industry?**

If you keep dropping tariffs, the incentive for FDI is less. So an optimum level of tariff is called for. This is difficult to pursue in real life and hence we should create an enabling environment for FDI in the country. Hence faster clearances, less of red tape, etc needs to be looked into for encouraging FDI in the country.

**What are EEPC initiatives towards meeting CO2 emission guidelines?**

As a trade facilitating body, we are engaged in disseminating various information in the adoption of environment-friendly measures in the manufacturing processes to meet the CO2 emission guidelines. This needs concerted action and active focus in the years ahead.

In view of the growing acceptance of India’s engineering goods, how do you foresee presence of primary iron, steel items and non-ferrous products in the next 2-3 years?

Well, there are key exports items and will continue to be so. They are the essential ingredients for engineering products. Without them, the products will cease to be called engineering goods. Hence they have a great presence.
...market shifting to Asia
Cntd. from pg 2
foundry technology is available at the
Nimra Education & Research Foundation,
Ahmedabad. Government should also have
foundry courses in ITI centres which are
located in foundry cluster areas.

Internationally, mainly in China, USA,
Germany, Japan, Poland, Czech Republic, etc.
a lot of importance is being given by foundry
technical institutes, which are part of faculty
of foundry engineering. IIF must have HR
division which will be the leading provider
of tools, products, services and information
related to the metal casting industry. The
mission statement should be: As a strategic
partner to the Metal Casting Industry to
drive education, training and technology.

On demand drivers for cast products.

Many multinationals, like Suzu, Foton,
etc have lined up plans for setting up plants
in India, and these companies will have
requirements in the range of 1,00,000
vehicles per annum during 2015-16.

Qualities demanded by these companies
are several notches above what presently
Indian foundries are capable of. A culture
compatibility with multinationals would
also be primary requirement of foundry to
meet their casting requirement. Therefore
there has to be a drastic increase in
transparency levels. Castings aesthetics
and ability to meet global demands will
continue for a few more years. India is likely
to think that in the near future we can
compete in the global castings market.
Output melt system has improved process
accuracy. The introduction of VIP Multiple
range, Multi-Pour technology coupled with
VISIPOUR P3 allows more than one mould
to be poured simultaneously, delivering the
highest moulding rates with the greatest
spurt in the growth is the engineering sector
by 2050. One of the reasons behind this
spurt in the growth is the engineering sector
supported by the foundry segment.

India’s Automotive Mission Plan 2006-16
estimates the foundry sector has potential
to boost growth of the auto
industry by four times,”
says Jagat Shah, Managing
Director, Inductotherm
(India) Pvt Ltd in an
interview with
Pareesh Parmar.

What is your 2014 industry outlook?
Population increases continue to fuel
local developments in growing economies.
Although the growth of the industry has
been impacted due to economic slowdown
during past couple of years, Indian casting
players are optimistic about higher growth
in the next few years. We believe the
current single digit growth rate is likely to
continue for a few more years. India is likely
to be a beneficiary as exports revive on the
back of strong demand from developed
economies. Simultaneously, domestic
demand will go up as major infrastructure
projects are expected to be taken up by the
new government at the Centre.

India is expected to be amongst top
three countries of the world in GDP terms
in safety, quality, productivity and efficiency.
They are open to recommendations,
presentations and new ideas, although at the
end of day, they are still bound by budgets.

Every day we continue to develop
new and better applications from A to Z
(aluminium to zinc) to support the metals
and materials industries worldwide. As part
of the Inductotherm Group, which brings
together some 40 companies strategically
located around the world, we provide our
customers with a greater competitive edge
than ever before.

On innovations at Inductotherm.
Inductotherm offers a complete line
of coreless and channel type induction
melting and holding systems. The company
has built furnaces with capacities ranging
from a few grams to hundreds of tons and
power supplies from 10 kW up to a 42,000
kW induction power supply system.
Our product line also encompasses a full
range of charging and preheating systems,
melt shop computer control systems,
automated pouring systems and ARMS
(Automated Robotic Melt Shop) Systems.
As a group, how do you transform
your products & processes in tune
with sustainability requirements?

We introduced advanced controls system
capable of complementing the fastest
moulding systems. Enhancing the product
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One of the reasons behind this
spurt in the growth is the engineering sector
supported by the foundry segment.

Our casting production has increased by
100 per cent in the past decade, and we can
clearly see an interest in automobile
manufacturers across the globe to explore
the Indian market. The Automotive Mission
Plan 2006-16 estimates the foundry sector
has the potential to boost the growth of
the auto industry by four times.
It is these facts that make it possible to
think that in the near future we can
contribute to the world automotive market
by nearly 7 per cent.

On the technological trends in
induction melting furnace globally.
People everywhere are open to improvements
in safety, quality, productivity and efficiency.
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In Person

FOUNDRY REVIEW @ FEBRUARY 2014

In Person

‘Sustainable thinking, energy efficiency should be design criteria’

How do you see the market for your products and solutions in Asia? We expect that 2014 will be a very good business year. The outlook for the Western world is very positive. The market for our products and solutions in Asia is good, but I expect a stronger focus in 2014-15 in Asia on productivity and efficiency than on capacity expansion.

As also, we see increased interest by our customers in discussion on green foundry concept, educating personnel and training workforce, etc. This augurs well for a company like us, which follows strong sustainable business practices.

How do you see technological trends in induction melting furnace? Technological trends in induction melting furnaces are characterized by focus on energy-efficient design and process to bring the practically specific energy consumption below 500 kWh/t; high power applications to melt 50 t/h and more – this is rather more specific to steel melting application with one crucible; and integrated safety, automation & environmental friendly solutions with focus on sustainability.

What is the R&D carried out by ABP Induction Systems? ABP supplied and commissioned recently high-powered furnace installations like 35t/18 mw or 40t/24 mw and 65t42 mw. Thus contributed hugely to induction technology by way of development of such large size MF induction crucibles as also very large MF power supply system built ever in the world.

Modern integrated fume exhaust systems add on the furnaces which would further the cause of sustainability.

As a group, how do you plan to transform your products & processes in tune with energy savings and sustainability? Sustainable thinking and energy-efficient solutions are design criteria and inherent characteristics of our products.

How do you see your relations with your customers from India? I’m still struggling in general with belief and views of quite a few of Indian customers in selecting the cheapest instead of the most economic solution based on life cycle cost concept and sustainable system. The discussion with our customers about sustainable product and processes is not easy – but is more and more successful.

Please share your experience at IFEX. I enjoy very much participating on the IFEX. This time it is personally my 15th IFEX participation, and I look forward to meet old and new friends and partners.

FATA-Rhino - a partnership of synergies

Since 1983 Rhino Machines has been synonymous with innovation and having technological edge in the field of moulding and sand mixing in India, the company says. On the other side of the globe in Italy, FATA has been internationally recognized with its advanced reclamation technologies that provide time-tested solutions for green sand and chemically bonded sand foundries.

Rhino Machines and FATA (Italy) have brought together their strengths to deliver next generation revolution in sand regeneration in India. They have found synergy in thoughts, vision and technology and have come together to deliver solutions that are tailored for Indian foundries – technologically superior, commercially viable and suited to individual foundry size. The coming together of common goals is also reflective of their distinct strengths. This is visible from the fact that since 1936 FATA has been the originator of the most efficient and sustainable technologies operating in reclamation plants, while Rhino is a well-established name in the foundry business with a holistic understanding on the need for sand regeneration and re-use.

“Our partnership motto is to provide total pollution-free, modular, low on maintenance and high on technology ‘Green’ solution thus providing international quality infrastructures at Indian price.

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Energy conservation

Typically, the specific energy consumption (SEC) in induction furnaces should be below 600 kWh/ton of molten metal in cast iron foundries. However, often foundries record higher specific energy consumption figures. Substantial reduction in power consumption in induction furnaces is possible through the implementation of better process control (BOP) of cupola furnace and the demonstration bed coke (DBC) shown in Fig 2.

Energy conservation in induction melting furnaces

It is important to reduce the overall energy consumption by increasing the product yield and decreasing the rejection ratio. Three-dimensional CAD method is useful in improving product yields and reducing casting defects. The method can be useful not only to reduce the volume of runners and risers for producing a casting but also to simulate the solidification process in order to predict shrinkages and other common casting defects.

Since CAD systems are expensive and require expert training, the use of computer-aided design (CAD) systems as common tool at a cluster level will help micro and small scale foundry units producing precision castings.

Energy-efficient pumps: Most of the foundry units use cast iron based centrifugal pumps whose performance in terms of efficiencies deteriorates over time. Substantial energy saving could be achieved by installation of energy efficient pumps of proper size (head and capacity requirement) preferably with stainless steel gun-metal impellers.

Unique opportunity

Most small scale units in India are using outmoded technologies and poor operational practices leading to substantial energy wastages. The Indian foundry industry, especially those operating in the MSME sector, presents a unique opportunity to optimize energy consumption and contribute to mitigation of climate change.

There is need a launch cluster level initiatives aimed at diagnosis and implementation of energy efficient technologies and practices as common tool at a cluster level. Indian government agencies and international donor organizations can play a vital role supporting energy conservation initiatives at the cluster level.
Transformation, upgradation - a major issue for Chinese foundries

"From the end of the last century until now, along with high speed of development of the Chinese economy, the China foundry industry also developed rapidly.

All kinds of casting production quantity have been increased continually. For more than 10 consecutive years, total casting production quantity has been number one in the world (in 2011, total casting production quantity was 98.6 million tons in the world, and in 2011 the number in China was 41.3 million tons). Chinese foundry industry is developing in the direction of changing from a big quantity casting producer to a developed producer. It is at the phase of transformation and upgrading. In this phase, the enterprises in the foundry industry are also facing the situation of survival of the fittest, which will redesign the structure of the foundry industry to get a new and big change.

There will be a lot of achievements in information technology fusion, high-new technology application, green manufacturing. All of these will enhance the foundry industry to be around $37.27 bn and 14.98 mt respectively.

In 2014 and 2015 the US castings industry would touch $39.69 bn and $39.79 bn, while the production capacity would reach 11.85 million tonne and 14.34 million tons respectively.

In the financial year 2013 the sales and production capacity are estimated to be around $37.27 bn and 14.89 mt respectively.

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US foundries witness resurgence

"If I were to present the situation of the American foundries a couple of years ago I would have felt a little uncomfortable due to weak US foundry industry data. However the industry today has taken a sharp turnaround with a revitalisation in the cast manufacturing.

Since recession the US has lost around 150 foundry plants.

"During 2011 and 2012 the US castings sales were around $29.64 bn and $36 bn, while the production capacity was around 11.85 million tonne and 14.34 million tons respectively.

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S African foundries growing with cautious optimism

There is a feeling of cautious optimism prevailing among most manufacturers in the South African metal casting sector. Following the successful launch of the Gauteng Foundry Training Centre (GFTC) last year, the first apprentices began their training at the GFTC in January 2014. GFTC is funded by government agencies, such as the National Foundry Technology Network, of government agencies, such as the National Foundry Technology Network, harbours projects.

As North American and European markets forecast strong signs of economic recovery for 2014 and as South Africa’s domestic currency weakens, it appears likely that there are opportunities for a recovery of exports of locally manufactured products, particularly in the automotive sector. Sub-Saharan African countries have reported high GDP growth rates of 5-7 per cent in recent years, which also presents opportunities for those foundries supplying the broad mining sector with wear-resistant and other castings.

Finally, continuing infrastructure development programme (CIPS) of nearly $80 Billion to be spent by the public sector over the next three years, presents significant new business opportunities as well as a few challenges to the metal casting sector. These projects – 18 in total - cover a broad spectrum within which the most attractive for foundries will be the energy sector (including the renewable energy projects), the railway network development and the supply of rolling stock for both freight and passenger transport, the upgrading of existing ports and harbours and the commencement of new ports and harbours projects.

With all this and the continuing support of government agencies, such as the National Foundry Technology Network, South African metal casters are confident of an improved trading year in 2014.
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r.senthilkumar@pemsl.com | www.foundr ysolution.com
Foundrymen is $15 billion and exports worth $2 billion (approx Rs 12,000 crore).

About problems confronting the industry at present...

The industry is facing supply sides issues like increasing energy costs; stringent environment and pollution control norms; lack of skilled human resource at affordable rates and challenge in attracting new talent; increasing raw materials cost; high cost of technology implementation in the manufacturing process; sand availability and further management...

...and the solutions to overcome them?

Some of the proposed initiatives include: awareness programmes in foundries at shop-floor level; working with the government to start a dedicated FUF (Foundry Upgradation Fund) on the lines of TUF (Technology Upgradation Fund); working with the equipment manufacturers to offer affordable recycling solutions for scarce raw materials like sand, and encouraging young successors to form a task force and come up with specific recommendations as to how to add glamour to the foundry industry.

Further, more and more user-industries should be encouraged to adopt foundries, the ITI model. The government could also initiate dialogues with the government so as to ensure devising clear standards for environment clearances, etc. among others.

On newer areas of growth for cast products apart from traditional ones?

Newer areas of growth for foundry products in India will be from defence, infrastructure, construction, and agricultural equipment.

Please comment on mechanization and automation upgradation of existing foundries in India?

Eighty per cent of foundry units in India are SMEs. Complete automation is seen only in very large foundries. Semi-automation is gradually catching up in some of the foundries, but still a large number of foundries which are jobbing in nature need mechanization and automation. One of the main hindrances is the cost of implementation of technology; hence it is imperative that more cost-effective solutions should be developed and made available by Indian equipment suppliers.

What does the future of Indian foundry industry hold?

We have been constantly working with upgrading our plants and we partner with our foundry suppliers who are able to offer the best technology that is available globally. We continuously work on process improvements and mechanization, new material substitution and energy savings. We have introduced ARCA (material flow cost accounting system) which is designed to reduce wastage and cost.

Your outlook for the industry please.

According to the 46th World Casting Census, India has produced 500,000 metric tons in the year 2011 and it is growing at a CAGR of 6 per cent since 2006-07. Due to the growing demand from the automobile sector coupled with demand from other sectors like infrastructure, construction, agriculture, the foundry market is expected to grow strongly in the near future.

Your expectations from IFEX 2014...

Under the banner of IIF, IFEX 2014 is the 10th edition of International Exhibition on Foundry Technologies, Equipment and Supplies and 5th edition of Cast India Expo on Indian casting manufacturers.

This year a large number of buyers and international delegates are visiting the exhibition. I expect a lot of value addition in terms of knowledge and business to all attendees and exhibitors. IFEX 2014 will bring a huge opportunity to the Indian foundry sector. The Cast Source Meet will bring international and national buyers and users under a common platform. Concurrent with the exhibition, there will be the Indian Foundry Congress where eminent speakers and industry stalwarts will discuss about growth, latest technologies, trends and market opportunities. All these are very important for the foundry industry of India.

Your suggestion to Indian exporters in adoption of quality guideline and technological advances for a sustainable future.

It is increasingly becoming clear that global market place will not accept bad products and technological deficient products. Hence, exporters have to invest in quality and technology so that we can move up the value chain and thereby ensure that we are less affected by global economic conditions. Our future lies in quality and cost competitiveness.
Unparalleled Performance of Inductotherm’s Multiple Output Furnace Systems

More than 500 Dual-Trak®, Tri-Trak® & Multi-Trak™ systems successfully working in India

Significant advantages of multiple output induction furnace systems include:

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- Preheat or sinter two furnaces simultaneously or melt in one furnace while sintering the other
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Important: Appropriate Personal Protective Equipment (PPE) must be worn by anyone in proximity to molten metal.